

**SECRET**

## THE SUPERSONIC TRANSPORT - A proposed Approach

by - Clarence L. Johnson

There has been enough written on the supersonic transport to lift it to its cruising altitude if all the papers were piled one atop the other. I do not intend to express herein any arguments for or against any particular design which has been proposed, but would like to express briefly a few personal views on how to get going on the project and point out a few factors which have been largely overlooked in the literature.

Assuming that the most likely cruising speed for the long range SST will be Mach 2.5 to 3.5 at altitudes of 60,000' to 80,000', I submit the following:

1. The safety problems have been greatly underestimated.
  - a. The high degree of artificial stability required for practically all configurations leads to complete dependence on very complex control systems.
  - b. While wing loadings will be low by present standards, so will be the landing and take-off lift coefficients. Most indications are that with practical lengths of landing gears, these values will be about 1/3 the lifts currently obtainable on jet transports and 1/5 those of the Connie, DC-7 types. Field lengths and take-off speeds are not likely to be reduced.

c. There is not likely to be any large reservoir of experience provided by the military services in this assumed speed range in the next five to seven years. Time at supersonic speeds in terms of transport operation is insignificant today. How are the engines particularly, and the host of other elements to be shaken down and de-bugged in flight without the usual military pioneering?

d. The much discussed temperature, cabin cooling, and structural problems all contribute first line safety problems.

2. Automatic approach and landing equipment is an absolute must for the SST. It will be economic suicide to try to carry the usual holding and diverting fuel reserves in airline operation. We must be able to go to our destination and land.

3. Our usual development and manufacturing methods are carry-overs from World War II conditions when we built thousands of aircraft of a given type. The SST should be built by simpler systems aimed at small production runs to control costs. Even with the best methods and people, the aircraft will be horribly expensive.

From the foregoing you might imply that "we can't get there from here" and that I am very pessimistic about the future of the SST. Actually I am not so at all. We are going to have them and reasonably soon. I am

not familiar with any except the usual approaches being considered to get the beast born, so I would like to propose the method outlined below for getting off dead center. Again, I am reflecting only my own personal views.

- A. The U. S. Government should finance the construction of six test aircraft. No longer can our transport builders give away a good share of their capital worth to the airlines for the doubtful pleasure of "staying in the commercial business."
- B. One manufacturer should be given the basic design job. Too many cooks can really spoil this pudding. Subcontracting of large elements of the production aircraft (beyond the six) would be fair and desirable.
- C. The six aircraft should be assigned, two apiece, to three airlines for testing (after the initial tests by the manufacturer). They should be equipped with crew ejection seats and flown with the latest type pressure suits for two years carrying cargo only. Any net income derived should be used to defray testing expense.
- D. It would be preferable to fly two of them over the nonstop U. S. transcontinental route, two between the U. S. and South America and the other two across the Atlantic or Pacific. This should give a good sampling of wind and weather conditions as a basis for later transport operation.

**SECRET**

E. The terminal points on the respective routes should be set up for automatic blind landing and take-off systems. Every landing should practice blind approach and landing conditions.

F. The data obtained in the testing should be carefully compiled and distributed equally to the military services, manufacturers, and other airlines.

After we have done the above, we should have some satisfactory answers to the problems posed at the beginning of this paper as well as a host of others on noise, economics, and operational problems.

The cost? A study of that element would take longer than the hour spent recording the above thoughts, but it is probably in the \$400,000,000 area--plus or minus 25 per cent.

If we do not do something along the above line, I fear for when we will get started on our next new round of transports and also the high degree of danger involved if a considerable testing period is not completed before we put John Q. Public in one.